REMARKS

Claims 1-15 are pending in the application. The prior rejections of claims have been overcome and have been withdrawn. Claims 1-15, however, stand newly and variously rejected under 35 U.S.C. §§ 102(e) and 103 (a). Applicants respectfully traverse the rejections, and request that the rejections be reconsidered in view of the following remarks.

Rejection under 35 U.S.C. § 102(e)

Claims 1-4, 6-9, and 13-15 stand rejected under 35 U.S.C. § 102(e) as being anticipated by US 6,830,597 to Green ("Green").

Independent Claim 1

Green itself is not prior art. Green was published on 14 December 2004. The priority date of the present application is 10 January 2002. Applicant draws the Examiner's attention to the fact that Green is a continuation-in-part of PCT/US98/16957, which itself was a continuation-in-part of 08/912,485. As the Examiner is aware, the disclosure of continuation-in-part applications may or may not enjoy the benefit of priority of prior applications.

Green discloses a biomass gasifier having a biomass reactor tube. Fig. 1 shows the specific structure of the apparatus. Biomass (not shown) is fed into an inner hopper 10. The biomass in the inner hopper is fed into a reactor tube 2. In this embodiment, a tapered auger 4 is used. Reactor tube 2 is correspondingly tapered. The reactor tube is formed of a material capable of withstanding high temperatures. Heat is conducted through the reactor tube walls 3. Gases given off during gasification of the biomass in the tube 2 are able to travel back along the tube, into inner hopper 10 and from there to gas outlet 13. By the time the biomass feedstock reaches the lower end of tube 2, it is composed of a mixture of char, ash and tar, depending on the conditions in the tube. Char extruded from the tube 2 is combusted in combustion chamber 6 in order to provide heat for the gasification process.

Nowhere does Green disclose that the auger flight 5 (i.e., the screw thread) of the auger 4 makes contact with the inner wall surface of the reactor tube. Furthermore, it is specifically disclosed that the reactor tube 2 should be tapered. Quite simply, Green discloses no more than a tapered auger.

In contrast, claim 1 recites that there is an ablative surface defining the periphery of a cylinder. A tapered tube 2 cannot be a cylinder, since the cross-section of the tube varies along its length. Green discloses a tapered tube. Green neither discloses nor suggests an "ablative

surface defining a cylinder," and therefore does not anticipate claim 1. To anticipate a claim, a reference applied against the claim must disclose every element of the claim. Applicant respectfully submits that Green does not teach every limitation of claims 1-4, 6-9 and 13-15.

Furthermore, claim 1 recites that the rotatable surface of the reactor is positioned relative to the ablative surface such that feedstock is mechanically pressed between a part of the rotatable surface and the ablative surface, and is moved along the ablative surface. In Green, auger 4 moves the biomass along tube 2. Auger 4 does not mechanically press the biomass against the inner surface of the tube. Instead, the movement of the auger flight only moves the biomass along the tube.

The Examiner asserts that at column 4 line 41 to column 6 line 41 of Green, Green discloses that biomass is mechanically pressed against the inner wall surface of a cylindrical tube to achieve thermolysis. However, there is nothing in this portion or any other portion of Green's disclosure which states that the mechanical pressing of biomass feedstock against a cylindrical wall surface.

As has been mentioned earlier in the prosecution of this application, the present inventors have found that the pressing of feedstock between the rotatable surface and the ablative surface, combined with the movement of the feedstock along the ablative surface, provides a surprisingly efficient thermolysis system. The prolonged pressing of the feedstock onto the ablative surface, and the simultaneous movement of the feedstock along the ablative surface, by the rotatable blades ensures an effective and efficient transfer of heat from the ablative surface to the feedstock.

Independent Claim 2

Claim 2 includes all of the limitations of claim 1, and further includes the limitation that the ablative surface is an outwardly-facing surface of an inner wall bounding the reaction vessel. In Green, tube 2 includes an inwardly-facing surface. There is no outwardly-facing surface at which thermolysis is taking place. Nowhere does Green disclose such a limitation.

Dependent Claim 3

Claim 3 depends from claim 2. Claim 3 recites that the rotatable surface is mounted outwardly of the ablative surface, and arranged to press feedstock towards the axis of rotation. This limitation is not disclosed in Green.

Dependent Claim 4

Claim 4 depends from claim 1, which is deemed patentable as discussed above.

Dependent Claim 6

Claim 6 depends from claim 1, which is deemed patentable as discussed above.

Dependent Claim 7

Claim 7 depends from claim 1, which is deemed patentable as discussed above.

Dependent Claim 8

Claim 8 depends from claim 1, which is deemed patentable as discussed above.

Dependent Claim 9

Claim 9 depends indirectly from claim 1, which is deemed patentable as discussed above.

Dependent Claim 13

Claim 13 depends from claim 1, and recites that the rotatable surface is resiliently biased towards the ablative surface. Green does not disclose this limitation, since, in Green, the auger 4 and the auger flight 5 are fixed with respect to each other. Although the Examiner comments that this limitation is shown in Green, there is simply no biasing of the auger flight 5 towards the inner surface of tube 2.

Dependent Claim 14

Claim 14 depends from claim 1, which is deemed patentable as discussed above.

Dependent Claim 15

Claim 15 depends from claim 1, which is deemed patentable as discussed above.

Rejections under 35 U.S.C. § 103(a)

Claims 10 and 12 stand rejected as being unpatentable over Green.

Dependent Claim 10

Claim 10 requires that the angle of the rotatable surface is adjustable, relative to the ablative surface. The Examiner acknowledges that this limitation is not shown in Green, because, in Green the auger flight 5 is fixed with respect to the tube 2. The Examiner

nonetheless asserts that such a limitation is merely a matter of "routine skill in the art." Applicant submits that the stated ground for rejection is not supportable. There is simply nothing in the present record that would have prompted one of ordinary skill to make the modification posited to have been routine skill.

Dependent Claim 12

Claim 12 requires that the spacing between the rotatable surface and the ablative surface is adjustable. The Examiner acknowledges that this limitation is not shown in Green, because the auger flight 5 is fixed with respect to the tube 2 as in Green. Nonetheless, the Examiner asserts that such a modification of Green is no more than routine skill. Applicant submits that there is simply nothing in the present record that would have prompted the skilled artisan to make the modification posited as routine skill.

Claims 5 and 11 stand rejected as being unpatentable over Green in view of U.S. Patent No. 4,374,704 to Young ("Young").

Young discloses a hydrocarbon materials pyrolysis apparatus. The problem solved in Young is that pyrolysis of hydrocarbon materials tends to form gummy deposits on the interior surface of the pyrolysis apparatus. Young solves this problem by providing a scraper and a brush for cleaning the interior surface of the pyrolysis apparatus. Neither the brush 28 nor the scraper 27 presses biomass feedstock against the interior surface of the pyrolysis apparatus.

Thus, the skilled person is not even given any hint from Young that Green might be modified to press biomass feedstock between a rotatable surface and an ablative surface. In contrast, for the first time, the present inventors have shown that taking this ablative approach to biomass thermolysis provides efficient and useful results.

Dependent Claim 5

Claim 5 depends from claim 4. Claim 5 recites that the rotatable surface presses feedstock away from the axis of rotation. This limitation is not shown in Green. Green's auger 4 is only capable of moving the feedstock along the axis of rotation. As discussed above, the skilled person would not have been motivated to combine the teaching of Green with the teaching of Young. More importantly, such a combination does not meet all the limitations of the claimed invention.

Dependent Claim 11

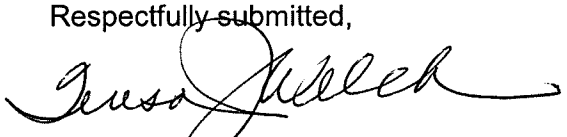
Claim 11 depends from claim 10, which is deemed patentable. As discussed above, the skilled person would not have been motivated to combine the teaching of Green with the teaching of Young. Such a combination does not meet all the limitations of the claimed invention.

CONCLUSION

In conclusion, no cited reference alone or in combination discloses the structure as recited in claims 1-15. As to the anticipation rejection, the Green reference does not disclose all the limitations of the claimed invention. As to the obviousness rejections, in the absence of any identifiable reason that would have prompted a person of ordinary skill to combine elements found in the references in the way recited in the claims, the factual predicate necessary to establish *prima facie* obviousness has not been established.

In view of the foregoing, applicant respectfully requests reconsideration and withdrawal of the outstanding anticipation and obviousness rejections. A notice of allowance is earnestly solicited. To further advance prosecution, applicant respectfully requests that Examiner Young contact the undersigned at the telephone number listed below when taking up this case to discuss any improvements to the form of the claims or any other matters.

Respectfully submitted,



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